Active Project (2014 - 2017)

Fiberless Optical Gyroscope, Phase II Project

SBIR/STTR Programs | Space Technology Mission Directorate (STMD)

ABSTRACT

We propose a radical new approach for to the design and fabrication of a fiber-less Interferometric Optical Gyroscope (IOG) that enables the production of a radiation hard, very small IMU with better performance, higher reliability, high level of robustness and lower cost. We estimate that an order-of-magnitude improvement in cost and size to performance ratio of IOG sensors and their corresponding assemblies can be achieved when compared to the conventional Fiber Optics Gyroscope (FOG) implementations, enabling high level of performance in a MEMs compatible IMU size. Such a system will be of great advantage for all future NASA applications that focus on small satellites and payloads

ANTICIPATED BENEFITS

To NASA funded missions:

Potential NASA Commercial Applications: The proposal will develop the key enabling component in a low cost, high precision inertial navigation system (< 0.10 ◆ accuracy, resolution). Low cost, higher precision and low weight/power (SWaP) inertial sensors are necessary components for future NASA applications, including Unmanned Aircraft Systems (UAS), Sounding Rocket and many other Autonomous missions as key technologies that have in NASA technology roadmap.

To the commercial space industry:

Potential Non-NASA Commercial Applications: The Navigational and high-end tactical IMU market is an expanding market with a push for improved performance. This expansion will be driven by cost and size reduction. The proposed IOG technology will be the smallest volume IMU on the market today. It will enable new commercial and DoD applications including airborne PODs, Line of Sight stabilization, weapon designation, Interceptor technology, individual soldier navigation, battlefield management, turret stabilization, missiles, UAV, AHARS and more.

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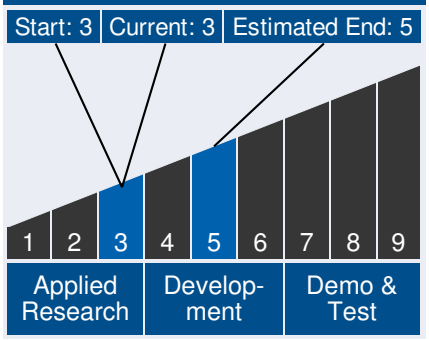
Technology Maturity



Management Team

Program Executives:

- Joseph Grant
- Laguduva Kubendran

Program Manager:

- Carlos Torrez

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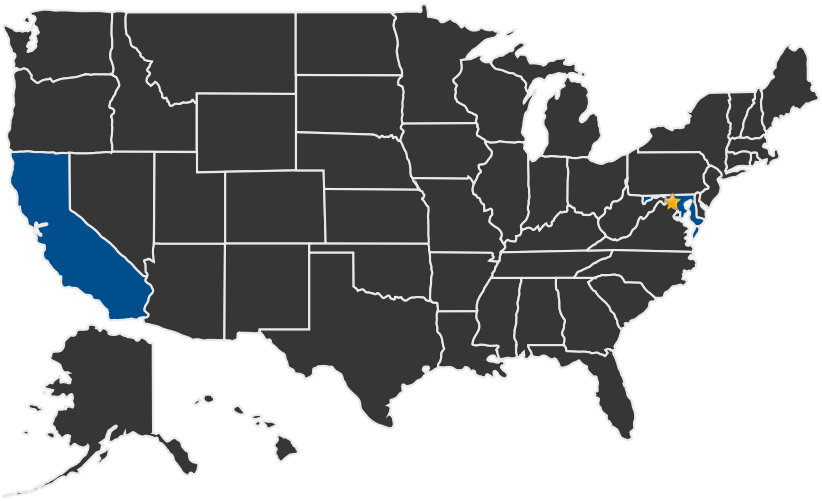
U.S. WORK LOCATIONS AND KEY PARTNERS



U.S. States With Work

Lead Center:
Goddard Space Flight Center

Other Organizations Performing Work:

- Gener8, Inc. (Sunnyvale, CA)

PROJECT LIBRARY

Presentations

- Briefing Chart
  - (http://techport.nasa.gov:80/file/22945)

Management Team *(cont.)*

Project Manager:

- Emmett Ransone

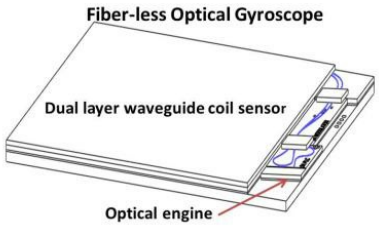
Principal Investigator:

- William Bischel

Technology Areas

Primary Technology Area:
Communications, Navigation, and Orbital Debris Tracking and Characterization Systems (TA 5)
└ Position, Navigation, and Timing (TA 5.4)
└ Sensors and Vision Processing Systems (TA 5.4.3)
└ Fast Light Optical Gyroscopes for Precision Inertial Navigation (TA 5.4.3.4)

IMAGE GALLERY



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DETAILS FOR TECHNOLOGY 1

Technology Title

Fiberless Optical Gyroscope

Potential Applications

The proposal will develop the key enabling component in a low cost, high precision inertial navigation system (< 0.10 accuracy, resolution). Low cost, higher precision and low weight/power (SWaP) inertial sensors are necessary components for future NASA applications, including Unmanned Aircraft Systems (UAS), Sounding Rocket and many other Autonomous missions as key technologies that have in NASA technology roadmap.